

he reports 6 consecutively successful cases of his own, since 1900, and says that "in the hyperplastic forms of caecal tuberculosis I advise resection." We prefer to follow Hartmann rather than Wiener in this form of the disease.

It cannot but detract somewhat from the completeness and permanency of the result to leave the disabled and diseased gut behind. It is necessary to do this when the tumor is fixed, when pus is present, and when the patient's general condition demands quick action with as little manipulation as possible.

In other cases—and this should include almost all of the hypertrophic type—the radical operation is much more thorough, not difficult, and attended by excellent results. This portion of the intestinal tract is especially tolerant of excision; four recent resections—and they are all that have been done within the last 3 years—have been uniformly satisfactory.

In our opinion, in the uncomplicated cases of hypertrophic ileo-caecal tuberculosis, resection should be the operation of choice, and if the patient is in good condition a primary resection with lateral anastomosis is certainly much easier, requires less exposure of the abdominal contents and less manipulation than a two-stage operation.

#### DISCUSSION.

DR. G. W. W. BREWSTER: Dr. Gage's paper on ileo-caecal tuberculosis is an important addition to the literature of this disease. There are very few articles in English, and we are fortunate in having the subject presented to us in such a comprehensive manner. That this lesion occurs with considerable frequency shows the importance of discussing the best methods of its surgical treatment. I have nothing to add to what Dr. Gage has to say about the treatment, and agree entirely with the views which he has expressed.

In looking over the records of the Massachusetts General Hospital for the last thirteen years, under the diagnosis of intestinal tuberculosis I found eighty-three cases. Of these eighty-three cases the histories showed that twelve could be classed as ileo-caecal tuberculosis. There may have been others, but I have selected only the ones in which the histories were definite. Of these twelve cases, seven occurred in young people between the ages of twenty to thirty, five cases between the ages of fifty and sixty. In four cases the pre-operative diagnosis of chronic appendicitis was made. In the five cases between fifty and sixty years of age, three were diagnosed as malignant disease. In all cases a mass was felt in the caecal region before operation. There were no operative deaths. The subsequent histories of the cases have not been obtained.

Ileo-colostomy was performed in eight cases, and, in addition, in two of these eight cases a radical excision was also performed. In three of the cases simple removal of glands for diagnosis was done, and the cases were presumably inoperable. In one case the record shows that the appendix alone was removed, and proved to be tubercular. I refer to these cases simply to show that the disease occurs with considerable frequency; no careful study was made of the individual cases.

I believe that this is an important surgical le-

sion, and I feel that Dr. Gage has treated the subject in such a way as to give us definite information as to the best treatment.

#### RIGHT COLECTOMY, WITH SPECIAL REFERENCE TO THE END RESULTS OF A SERIES OF TWELVE CASES.

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THERE exists a great diversity of opinion as to the advisability of operative procedures for the relief of intestinal stasis and its concomitant toxemia depending upon functional disturbances of the colon. This is due in part to the fact that the end results obtained, in this country at least, by Lane's operations, total colectomy and ileo-sigmoidostomy, leave much to be desired. Crippling post-operative adhesions, requiring secondary operations, are quite apt to occur after total colectomy. I have had no experience with this operation, but Clark<sup>1</sup>, reporting a series of twelve cases, concluded that in only six of them could the result be considered as entirely satisfactory. Three of these patients required re-operation for obstructive symptoms, and one of these died.

Lane himself appears to have discarded his original ileo-sigmoidostomy except in cases of necessity. My own experience with this operation has been limited to three cases. It was done once for an inoperable carcinoma of the cecum and upper sigmoid, and twice for obstinate constipation associated with multiple adhesions. Both of these latter cases had been subjected to many operations and one had had a resection as well of five feet of the small intestine. X-ray examination with the opaque meal showed in all three its passage to the cecum. One of these patients has four to six movements daily and the constant presence of a large doughy mass in the ceco-colon; another has nine to thirteen movements daily; while the third patient (carcinoma) has been lost sight of. There was an undoubted improvement over the original condition, but the results could not be considered as entirely satisfactory. I should under no circumstances consider the operation except as one of necessity.

As being less extreme, colo-colostomy and ceco-sigmoidostomy have been suggested as a means of overcoming stasis. These are mentioned only to be condemned. They are illogical and absolutely unsatisfactory operations. My experience with these procedures has been limited to three cases. One of these was a colo-colostomy done by myself, and the other two were ceco-sigmoidostomies done by colleagues. Each has been an unqualified failure from the standpoint of relieving the constipation. X-ray

examination in two cases showed that the barium was traversing the colon by the normal route instead of passing by the artificial stoma, and at fifty hours there was still marked ceco-colonic stasis. In fact, the stasis was no less than that shown previous to operation. The third case showed, after ceco-sigmoidostomy done for inoperable carcinoma of sigmoid, great distention of the colon and the presence of a fecal mass in the left lower quadrant. These conditions were relieved by a left colostomy.

Occupying a middle ground is right colectomy, by which is meant the removal of the terminal five or six inches of the ileum, the ceco-colon, and the first few inches or more of the transverse colon. This operation appears to be followed by less unpleasant post-operative sequelae than total colectomy or ileo-sigmoidostomy, and to be fully as satisfactory in relieving stasis. It removes the most common site of stasis and the most important surface from which the toxic substances are absorbed. Bloodgood<sup>2</sup> appears to have been the first to establish its value for conditions which he first described as chronic gastro-mesenteric ileus, and later as chronic dilatation of the duodenum. It seems to serve the purpose equally well in stasis in any part of the colon, provided it is not dependent on adhesions or organic disease. I have been greatly impressed with the striking benefits obtained from this operation in properly selected cases, and the absence of unpleasant end-results traceable to the operation itself. Quite naturally, only such cases as have failed of relief by simpler measures are considered suitable for operation, and these simpler measures have con-

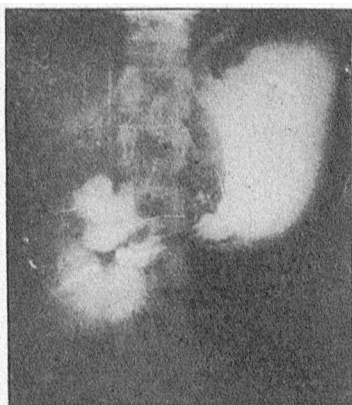


FIG. 1.—No. 6040. X-ray plate showing dilatation of duodenum.

sisted of proper abdominal support, exercises, regulation of diet, administration of suitable cathartics, intestinal antiseptics, lactic acid bacilli, colonic lavage, etc. On the whole, these patients are a most wretched class, going from doctor to doctor, hospital to hospital, and through operation after operation, seeking a relief which they almost never get. They are either considered neurasthenics and treated as such, or, when believed to have organic disease, the

wrong organ is deemed to be the source of trouble, and they are subjected to needless gastro-jejunostomies, appendectomies, oöphorectomies or hysteropexies.

A brief summary of the indications for operation and the end-results in a series of twelve

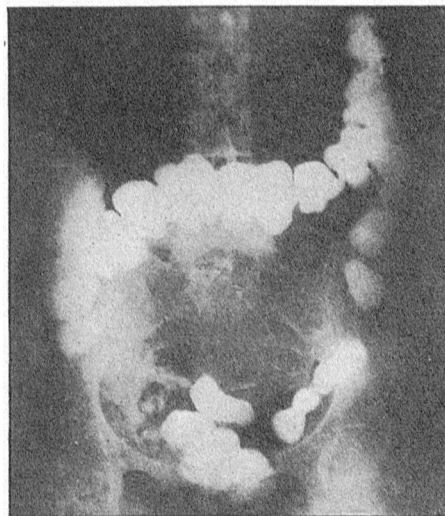


FIG. 2.—No. 6040. X-ray plate showing 96-hour stasis.

cases of right colectomy is submitted for your consideration. Three of these are of little interest because the indication for operation was organic disease, but they are included in order to consider the effect of the removal of the right colon on the bowel function and general health. One patient had an incarcerated umbilical hernia, consisting of right colon and terminal ileum with necrosis of the cecum, and two others had malignant disease of the ceco-colon. One of these had previously been operated upon and abandoned as hopeless. He is now, eleven months after operation, well and working as a street laborer. The other died of extension of the disease in the tenth week.

The remaining nine had symptoms assumed to be due to disturbances of colonic function. One patient had a chronic arthritis of two years' duration, becoming progressively worse, crippling her and confining her to bed. The right colon alone appeared to be at fault and was removed, and at the same time the gall-bladder, which appeared slightly thickened, was drained. Cultures from it, however, were negative. Clinically the relief was striking. There was immediate cessation of symptoms, and now, twenty-three months after operation, she is able to walk and use her hands for fine needlework, although the x-ray suggests some extension of the hyper-trophic process.

The second patient had had for some ten years frequent bowel movements, often as high as twenty-five to thirty a day. He was a tall man, thirty-four years of age, who, up to his present illness, had always been constipated, and especially so during his college life, although an athlete of promi-

nence. After graduating he commenced to have alternating attacks of diarrhea and constipation, ending finally in the persistent, urgent diarrhea. In spite of prolonged investigation and treatment, including an exploratory laparotomy and an appendectomy, he has grown progressively worse. An x-ray examination by Dr. George showed twenty-four hour ileal and cecal stasis, with what appeared to be constrictions in the terminal ileum, cecum

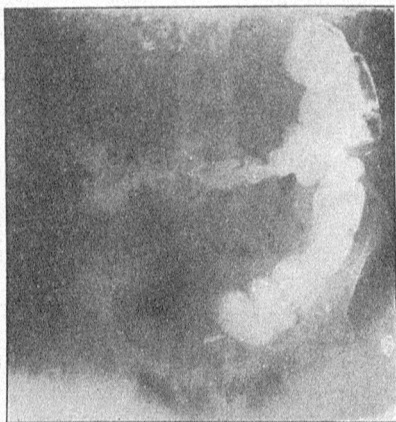


FIG. 3.—No. 6040. X-ray after right colectomy, 11 hours after barium meal, showing ileum empty.

and ascending colon. The history suggested that the primary constipation had been the etiological factor, and the x-ray seemed to confirm the belief that the seat of the trouble lay in the ileo-cecal region. At operation there were no adhesions or constrictions, but there was marked mobility of the ceco-colon, with thickening and injection of this portion of the bowel well around to the transverse colon; the terminal ileum was also thickened and the ileo-cecal valve admitted two fingers. In addition there was a very vascular pericolic membrane, enlarged retroperitoneal glands, and dilatation of the duodenum. The terminal ileum and right colon to what appeared to be normal transverse colon were removed. On opening the bowel, it was found thickened, injected, and filled with a foul-smelling dark liquid. A few small flat ulcers were found in the cecum, but owing to the contraction of the bowel it did not become apparent until some time later that it was studded with them clear to the line of amputation, suggesting that not all of the diseased tissue had been removed. The pathological report was stercoral ulcers. Later a colostomy was done to facilitate irrigation. Under irrigation the movements dropped to seven, and in two weeks, to four a day. They continued at about that average for several months, but after his return to his work they increased to nine daily. A proctoscopy, done three months after operation, showed a practically normal mucosa where it had previously been deeply injected and, at the recto-sigmoidal juncture, a small flat healing ulcer. He reports, seven months after operation, a gain of fourteen pounds in weight, marked improvement in appearance and strength, and less nervousness.

It is possible that the operation was ill advised. Further time will be needed to determine its full value. Opinions obtained from many prominent surgeons as to the proper treatment varied greatly and none was particularly hope-

ful. Cecostomy seemed inadequate, and ileostomy was objected to by the patient. However, the excellent results obtained by Lynch<sup>3</sup> and his associates in somewhat similar cases, suggest this to be, perhaps, the more logical procedure, although I felt at the time that it would not remove the seat of the disease.

The other seven patients had symptoms which appeared primarily to be of gastric origin. Five had intermittent attacks of epigastric pain, persistent nausea and vomiting, and constipation, associated with marked failure in general health, headaches, nervousness, faintness, and often dizziness. One of these had a mental depression with suicidal tendencies. A sixth did not vomit often, and the epigastric pain made its appearance in two or three hours instead of immediately after eating, and at operation flat, non-indurated ulcers were found. The seventh did not vomit, but presented the other symptoms, and in addition a persistent crippling right-sided pain. None of these was entirely well between attacks, but all were easily fatigued, subject to nervousness and epigastric discomfort due to flatulence. With two exceptions, all were constipated. One had normally five or six movements a day, and the other thought the bowels moved at least once a day but more often five or six times; the movements were then apt to be small, liquid, and to contain hard lumps. That the bowels are now normal in one case and require mild catharsis in the other after a right colectomy rather confirms the belief that the frequency was due to stasis.

Of these seven, six were females and one male. The average age at which symptoms had begun to be more or less persistent was twenty-one, and the average duration of the illness at the time a



FIG. 4.—No. 6040. X-ray after right colectomy taken 24 hours after barium meal.

right colectomy was done was seven years. Five had had previous operations, four of them elsewhere. One had been operated upon twice and another four times; this latter had had an appendectomy, a laparotomy for adhesions, a vaginal repair, and finally a gastro-jejunostomy for a supposed duodenal ulcer. Neither the his-

tory, x-ray or later operative findings gave any evidence of ulcer.

Owing to the fact that these patients between their attacks often have a voracious appetite with sensation of faintness between meals, it is frequently assumed that the symptoms are due to an ulcer. Gastric analysis in five instances showed sub-acidity four times and within normal limits once. More frequently still, however, is the gastric disturbance supposed to be a reflex indigestion due to a chronic appendicitis. And what bears color to this belief is the fact that there is often tenderness and pain over the appendix, and at operation it may be in a state of chronic inflammation. Four of these seven patients had had their appendices removed, but their symptoms persisted.

The history of the first colectomy in this group brings out so clearly the major symptoms that it seems worth while to give it in brief:

Miss I. M., Scotch nursemaid, twenty-three years of age, entered the Beverly Hospital June 11, 1913, complaining of epigastric distress, persistent nausea, vomiting, loss of strength and obstinate constipation. Her symptoms had begun six years before in Scotland, first with obstinate constipation, followed later by epigastric distress and vomiting. She was thought to have an ulcer of the stomach. The symptoms persisted in intermittent attacks for three years, followed for two years after coming to this country by comparative health. After this there were three attacks lasting from six to nine weeks each. Between these attacks the health was only fair, and there were headaches, indigestion and constipation. The attack for which she sought relief had commenced in February, 1913, and had persisted, with but little respite, up to the time of her entrance to the hospital in June. The distress and vomiting came on immediately after eating and often continued for several hours. The vomitus consisted of food or dark brown liquid, and vomiting alone gave relief. The appetite was poor; the bowels constipated, never moving without medicine. There was loss in weight of ten pounds, weakness, headaches, faintness, and at times dizziness. She had been in bed for a long time, the conditions being considered secondary to ptosis and constipation. Examination of the stomach contents showed sub-acidity, while the x-ray showed ptosis of stomach and colon, cecal stasis, and the appendix. As she failed to improve, an exploratory operation was done on July 6, 1913. Conditions were found confirmatory of the x-ray: the appendix was thickened and contained concretions; practically all of the small intestines, transverse colon and a cecum mobile occupied the pelvis; the ascending colon and first portion of the transverse colon were held together by Jackson's membrane; the duodenum was dilated to the mesenteric root which was drawn very tightly across it; the terminal ileum had a very short mesentery, and the stomach was atonic and dilated. The operation consisted of an appendectomy and freeing of Jackson's membrane.

She was discharged August 7, 1913, with a proper fitting abdominal support. In spite of a long rest, diet, exercise to develop muscles and increase the capacity of her upper abdomen, her symptoms soon reappeared and she returned to the hospital on March 5, 1914. As I had been impressed with the

similarity of her symptoms to those which Bloodgood has described under the caption of chronic dilatation of the duodenum, I communicated with him. On his advice I did a right colectomy, verifying his observation that downward traction on a mobile cecum in the presence of a short mesentery to the terminal ileum produces constriction of the duodenum where the mesenteric root crosses it. Coincident with this traction there was blanching of the face, a marked softening of the pulse, and a drop of 10 m.m. in blood pressure. The relief which followed the operation indicated that the symptoms were undoubtedly due to the intestinal stasis, ptosis, and secondary dilatation of the duodenum. After convalescence she returned to her work and has remained well since. The bowels move once daily.

The x-ray in every instance showed colonic stasis, and the principal and most striking operative finding was a marked mobility of the



FIG. 5.—No. 6040. X-ray after right colectomy. Barium enema. No reflux of barium into ileum.

ceco-colon. In each case it could be brought well out of the wound and twice for seven or eight inches. Once there was found an embryonic condition of the colon, *i.e.* failure of rotation. Four times there was marked dilatation of the duodenum clear to the mesenteric root, and twice it was recorded as being much larger than the colon. Five times the presence of large amounts of feces in the cecum was noted. In practically every case there was marked enlargement of the retroperitoneal glands and also the so-called Jackson's membrane which, however, seemed to be more often supportive than obstructive.

Of these seven patients, five have been operated on two years or more, one about ten weeks and the other six. These last two are, perhaps, too recent for a consideration of their permanent end-result, although there is marked improvement in appearance and general health with a cessation of their distressing symptoms. In the first, the relief from mental depression and an intractable vomiting of two months' duration was almost magical.

The remaining five patients are now all able to be at their work and, with one exception, consider themselves entirely relieved of their symptoms and in every way improved in health. The one exception was the patient in whom non-indurated gastric ulcers were excised but a gastro-jejunostomy not done. She, although very much improved in health, still complains of periods of epigastric discomfort similar to those previous to operation, and seen during an attack the gastric analysis showed retention and sub-acidity, while the x-ray showed twenty-four hour gastric stasis.

It is interesting to note the effect of this operation on the function of the bowels. Of the twelve patients operated on, one with malignancy died in the tenth week, and definite knowledge of the patient with the umbilical hernia cannot be obtained, although she is known to be in good health and at her work as a domestic nurse. This leaves ten cases to be considered. One patient with carcinoma of the cecum reported normal movement before operation and the same condition after. Of the six who had obstinate constipation, three report one natural movement a day, and one sometimes two; one occasionally requires mild cathartics, and another takes cathartics each night for fear of constipation. Of the three who had more than one movement a day—two reporting five or six, and the third twenty-five or thirty—the first now has one natural movement a day; the second requires mild cathartics; while the third, though very markedly benefited for the first few months, now has eight or nine. Summed up then, six have one and at the most two normal movements daily, while one occasionally, and two habitually, require mild cathartics, and one has eight or nine where he had previously had as high as twenty-five or thirty. Improvement then in bowel function followed the right colectomy in every case, and there is no evidence that it has had any but a beneficent effect on the general health.

In a post-operative x-ray study of nine cases made for the purpose of determining whether the absence of an ileocecal valve had any effect on the emptying of the small bowel, it was found that in no case was there any damming back in the ileum or any evidence of dilatation of this portion of the bowel. In all cases where there was no gastric stasis, the ileum was empty by ten and a half hours, and at this time, in practically every case, the head of the meal was in the pelvic colon, even in those patients who were constipated. After this time there was apparent slowing of the current, as though the meal were being retained in the transverse colon for absorption. Inasmuch as the emptying time of the ileum is as quick as normal, and the bowel movements are normal in consistency or slightly constipated, it would seem that the remaining colon must have the properties of absorption as well as storage, and that the lack of an ileocecal valve was of no importance. In making

these investigations a great many examinations were made at close intervals after the ileum was found to be empty, in order that we might be sure that there was no reflux into it. For her invaluable assistance in carrying out this work, I am greatly indebted to Dr. Isabel Bogan.

The operation consisted of the removal of the last few inches of the ileum, ceco-colon, and about a third of the transverse colon. In my earliest cases I did not remove as much of the transverse colon as I did later, and post-operative x-ray examination shows redundancy and ptosis of this portion of the colon, although the functional result is perfect. An ileostomy in a malignant case was done once and an ileocolostomy with suture eleven times, four times by lateral and seven by termino-lateral anastomosis. Authorities seem about equally divided between the lateral and the termino-lateral method. C. H. Mayo<sup>4</sup> prefers the latter, made with the Murphy button, which undoubtedly has the advantage of shortening the operation and perhaps eliminating some of the dangers of sepsis. I have never used it. Pouching of the blind end of the ileum is the principal disadvantage of the lateral method. X-ray examination in two of these cases showed that the barium promptly left the ileum except for an area close to the transverse colon, which was persisting at twenty-four hours in one instance and forty-eight hours in the other. In an ileo-sigmoidostomy, performed by the lateral method, an ileac pouch three inches in length had formed seven months after operation.

In one case only, and then for fear of kinking, was the stump of the colon fastened to the anterior abdominal wall. So far, at least, no symptoms have arisen which suggest that failure to do this was unwise, although for the future I should be inclined to follow Mayo's method of attaching the stump into the upper angle of the wound. This he does so that it may be opened to allow the escape of gas if stasis and distention occur. Moreover, this fixation would seem to have the additional advantage of suspending the transverse colon between this point and the splenic flexure and so prevent ptosis.

Although none of these patients could be classed as good surgical risks, there were no operative deaths. In nine cases there was kept an operative chart recording the blood pressure every ten minutes and the pulse every five. In four instances there was a rather sharp drop in blood pressure which was, however, in two cases overcome during operation. The two showing marked shock were malignant cases. The five remaining charts showed an undisturbed course throughout, nor was the post-operative convalescence more serious than after the average major operation.

We have then in right colectomy an operation which can be performed with a low mortality and which offers relief to those sufferers from intestinal stasis without imposing upon them any dangers of unpleasant end-results. The

general health was in every way improved in the so-called functional cases of this series. The bowel function was in every way bettered; where constipation continued it was slight, when before it was intractable; where there had previously been diarrhea, it was entirely remedied or markedly benefited.

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## DISCUSSION.

DR. JOHN T. BOTTOMLEY: Dr. Johnson's paper is most interesting, and it brings into the field of intestinal surgery some unusual features. I shall confine my remarks to two phases of the subject: first, right colectomy in its relation to the treatment of chronic arthritis and, second, right colectomy and other operative procedures in relation to treatment in a certain number of cases which we formerly classified loosely under the head "chronic appendicitis."

From the technical point of view two points in the doing of colectomy are worthy of emphasis. The posterior peritoneum should be incised to the outer side of the cecum and ascending colon, and these portions of the large intestine widely and thoroughly freed and mobilized. This procedure is essential to ease of operation. In colectomy for non-malignant conditions, the line of section through the mesentery can be carried close to the intestine; however, in the presence of malignant disease, the fact that the glands, too, must be removed forces us into the doing of a wide resection. In many patients the ileo-colic artery is easily seen running in the mesentery, and its ligature a short distance from the point of origin makes a relatively bloodless operation of right colectomy, and at the same time permits of a wide and relatively easy removal of possibly affected glands.

I have been particularly interested in the effect of such procedures as right colectomy and ileo-sigmoidostomy on cases of chronic arthritis. Such experience as I have gained from eleven cases leaves my mind in a state of doubt as to the curative value of such procedures. Of the eleven cases but one is truly cured, and the young man remains cured over three years after ileo-sigmoidostomy, despite the fact that even now roentgenoscopy shows that there is a marked iliac stasis. Yet within a few weeks I have done a right colectomy for a similar chronic arthritis, have seen the patient gain almost miraculously for a week, only to see her three weeks later practically as crippled as ever. What change did we bring about in her and how did we accomplish this change that caused so great and so immediate an improvement in this girl for the time being, and that so quickly suspended its favorable action? I do not know.

It is only fair to state that all cases we have operated on have shown speedy relief from their toxic symptoms. The malaise, the sensitiveness of the joints, the sweats, the cold, clammy hands have disappeared quickly and in many cases permanently, even when the joint-motion has remained uninfluenced.

What shall we do for that type of case which shows a symptom-complex formerly regarded as chronic appendicitis and which, when operated on, shows no evidence of appendiceal inflammation? Are we justified in employing here so radical a procedure as right colectomy? I must say that I am not convinced that we are. Many of these cases are improved or cured by other than operative means; in others I have removed the appendix and plicated the cecum, thus lessening its size. With such a colon as Dr. Johnson describes, *i.e.*, one loose, flabby and loaded with hard fecal masses (after the usual measures for emptying bowels had been employed), I should be inclined to do a right colectomy.

I want to say a word of warning with regard to two-stage operations in malignant or tuberculous disease in the ileo-cecal region. If you do at the first stage an anastomosis of the ileum to the transverse colon, be prepared to meet in the second stage (removal of the growth), a task rendered very difficult by numerous widespread adhesions.

## THE ADVANTAGES OF CONSERVATIVE SURGERY IN OPERATIONS FOR DIVERTICULITIS OF THE DESCENDING AND PELVIC COLON.

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ALTHOUGH numerous causes have been assigned and various theories formed, in an effort to explain the etiology of acquired or false diverticula of the descending and pelvic colon, there exists, at present, no unanimity of opinion in this matter, and the various theories proposed have been substantiated by neither clinical nor experimental evidence.

This condition of affairs results primarily from the fact that, until recently, diverticula of the intestine were looked upon as pathological curiosities, and their clinical and surgical import either not realized or insufficiently appreciated. Virchow, thirty years ago, referred to diverticula, as an "unusual pathological condition," but, during these thirty years, our views have changed in regard to this subject, and our knowledge of it has progressively increased.

Many conflicting opinions are held in regard to the etiology of this disease. We have Klebs' statement that it results from traction exerted on the bowel by the mesentery, and the opposite view of Hansemann that pulsion within the bowel is the primary cause. As a further instance of the existing diversity of opinion, Klebs' statement may be mentioned, that the condition occurs in fat people, while Hansemann seems to lay emphasis on the fact that most of his subjects were lean.

Although the consensus of opinion seems to be that diverticula occur in middle life, nevertheless, there are a few cases recorded occurring at the ages of three and seven years.